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BEHAVIOR ANALYTIC APPROACHES FOR RECRUITING INDIVIDUALS TO COMMUNITY-BASED PREVENTION PROGRAMS

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ABSTRACT: A number of primary-intervention studies with typical adults and children in open-community settings have been conducted in the area of applied behavior analysis. For example, communities and researchers have attempted to reach out to certain populations by designing and offering community-based prevention programs. In such attempts, the target individuals have not yet experienced the contingency between the participation and its consequence; that is, it is likely that the recruitment depends on antecedent control of participation. The present paper reviewed studies with group designs in which the individuals were recruited to community-based prevention programs. The selected studies were classified into the following four antecedent control procedures used in the studies: stating contingencies in the invitation; altering the value of consequence through the invitation; manipulating response effort; and others. After specific recruiting strategies used in the studies were examined, the authors concluded that many of the studies consisted of multiple and confounding variables. It is recommended future studies isolate the effects of different independent variables, rather than evaluate treatment packages.

KEYWORDS: recruitment, attendance, community-based programs, antecedent control

When a problem is recognized within a society, community, or individual, there are two types of approaches to the problem: primary and secondary (Hovell, Wahlgren, & Russos, 1997; Winett, 1991). The primary approach is preventive or precautionary. For example, if there are a number of car accidents in a given community, the primary approach to the problem is to design an intervention to stop accidents from occurring. The secondary approach is implemented once the problem has occurred. When a medical doctor attempts to cure a patient's existing illness, the doctor applies a secondary intervention. Behavior analysis has mostly been used for a secondary intervention, which typically targets a limited number of individuals identified with a problem, and the treatment is tailored for each individual (Winett, 1991).

To date, however, primary-intervention research with groups of typical adults and children in open-community settings has also been conducted in the area of applied behavior analysis (Fawcett, 1991). Such research is more population-based, rather than single-subject based, and the ultimate goal of the research is to modify the behavior of a larger number of people in order to diminish problems in a given community or society. In fact, behavior analytic interventions, many of which targeted a large group of individuals selected randomly, have been successful with a number of societal issues such as energy conservation, chronic diseases, public hygiene, and road safety (Hawkins,

Greene, & Fuqua, 1995). For example, Lombard, Neubauer, Canfield, and Winett (1991) conducted a behavior analytic community intervention to increase the behavior associated with skin cancer prevention. Lombard et al. used modeling, posted feedback and goals, and a raffle to successfully increase the protective behavior of approximately 600 people at swimming pools. Another example is the study by Jason, Billows, Schnopp-Wyatt, and King (1996), who targeted the reduction of cigarette sales to minors, which in turn would prevent minors from smoking. The subjects were 120 randomly selected stores in a major metropolitan area, of which 30 were in a control condition. When fines and license suspension were enforced, illegal sales were reduced. Biglan et al. (1995) were also successful in reducing the number of store clerks willing to sell cigarettes to minors in four small communities. During the intervention, non-sellers received rewards such as gift certificates and newspaper publicity. Sellers received written reminders stating that it was illegal to sell cigarettes to minors.

RECRUITING COMMUNITY MEMBERS TO INTERVENTION PROGRAMS

Many primary intervention programs require community members to come to the program site to participate. Greenspoon (1997) stated that for the program to be successful it is essential not only that the participants comply with the demand given within the program, but also that the participants actually keep appointments and come to the program. Bunck and Iwata (1978) also emphasized that the successful application of intervention research requires solving problems “regarding access to and communication with the target client population” (p.76). In other words, designing a procedure to attract more individuals from outside a limited environment is a necessary, although not sufficient, condition for any intervention program. In response to such necessity, research has been conducted to recruit people to community-based intervention programs such as cancer screening (Clover, Redman, Forbes, Sanson-Fisher, & Dickinson, 1992) and parent education classes (Connors & Gabel, 1983).

INVITATIONS TO THE PROGRAM AS RULES

When the community prevention program in question is newly developed, it is likely that the recruitment procedure will depend on antecedent control of participation. That is, since the target individuals have not yet participated in the program, they have not yet experienced any contingency between participating and its consequence. Therefore, the recruiters provide the target individuals with antecedent stimuli to increase the probability of participating. The antecedent stimuli, such as invitations to the program, may indicate the target response(s) and the consequence(s). For example, an invitation to a parent education program may state what behavior of the invitees is expected, such as coming to the site on the specified date at the specified time. It may also implicitly or explicitly state what consequence will follow the behavior, for example, that an educational session will be conducted in which the participants will learn some tips that make them become better parents.

These properties of invitations, in fact, are congruous with the definition of a rule (McComas & Progar, 1998). Pear (2001) also noted that although there are several different definitions of a rule, the definitions agree that a rule is a verbal stimulus, which is spoken or written, that specifies a target behavior and a consequence presented contingent on the occurrence of that behavior.

FACTORS THAT INFLUENCE THE EFFECTIVENESS OF RULES

Clearly Specified Contingencies

The contents of the invitation, in addition to merely stating “Come to the program,” may affect the number of participants in the program. For example, McComas and Progar (1998) and Reese (1992) argued that rules are more successful when they clearly specify all components of the contingency. For example, while “Come to the program,” only states an expected target behavior, “Come to the program, take a mammogram, and receive useful information about breast cancer,” includes some of the consequences that will occur as a result of the target behavior. More individuals are expected to participate in the program when the latter statement is addressed in the invitation. A fundamental question, regardless of the specification of the contingency, is whether or not the specified consequence is an effective antecedent for participating. Therefore, clearly specifying contingencies in the invitation is a prerequisite of successful recruitment, although it may not evoke the target behavior when the magnitude of the specified consequence is not large enough.

The Value of Consequence Altered

McComas and Progar (1998) also mentioned that the likelihood of the target behavior will increase when the rules state that the consequences to be provided will be more immediate, less intermittent, and/or less uncertain. Such manipulations may be considered establishing operations, when the value-altering of the consequence results in the change in the occurrence of the behavior (Laraway, Snyckerski, Michael, & Poling, 2003; Michael, 2000). In the case of recruitment, a researcher may change the value of consequences by presenting or removing certain information about the consequences such as how immediately a tangible reward is given to the participants after the program. In addition, some studies demonstrated that a limited access to a consequence increased the target behavior relevant to the consequence (Klatt, Sherman, & Sheldon, 2000; Vollmer & Iwata, 1991). Thus, in a recruitment study, if the invitation states that the consequence for participating in the program will be available only during a limited period or for a limited number of participants, the information may increase the number of participants.

Reduction of Response Effort

Another possibility for creating effective rules may be to state the target behavior in a way that the response effort for the behavior is diminished. For example, Newkirk,

Feldman, Bickett, Gipson, and Lutzker (1976) found that residents of extended care facilities attended more recreational and therapeutic activities when the location of the activity room was central, rather than peripheral. The smaller response effort for attendance in the central-room condition may have been responsible for the outcome. In recruitment studies, researchers may also increase the number of participants in the program by manipulating the accessibility of the program. For example, including a statement such as the program will be held near the target individual's house or free shuttle buses will bring the participants to the site may increase the likelihood of program attendance.

To summarize, recruitment studies depend on the antecedent control of participation, in which the recruiters may manipulate the contents of the invitations delivered to individuals. Such studies are classified into at least the following three groups according to the antecedent control procedures used as independent variables: contingencies stated in the invitation; the value of consequence altered through the invitation; and reduction of response effort stated in the invitation.

The present paper reviewed studies that recruited individuals to community-based prevention programs. The studies were first categorized into groups according to the antecedent control procedures used. After specific recruiting strategies used in the selected articles were identified within each category, characteristics of recruitment studies for prevention programs and some possibilities for future research were discussed.

METHOD

Definitions of the Key Terms

Recruitment. In the reviewed studies, the researchers invited individuals to prevention programs using antecedent stimuli or invitations, such as radio announcement, letters, and phone calls.

Target individuals. In the present paper, the people who were invited to the programs by the researchers are called "target individuals," rather than "participants," because they did not necessarily participate in the programs in question.

Prevention programs. The individuals approached by the researchers in the reviewed studies were not necessarily experiencing the health or social problems that the programs targeted. That is, the purpose of the programs was preventive, precautionary, and/or educational in nature. Also, it was not mandatory for the individuals to participate in the program.

Attendance. The target individuals were required to physically come to the program to be considered that they attended at the program. However, staying throughout the program was not included in the definition of attendance.

Literature Search

Search strategy. To maximize the number of articles to be reviewed, initial literature search was conducted using three online databases, *PubMed* (1950-2004), *PsycInfo*

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(1840-2004), and *PsycArticles* (1985-2004), and the *Journal of Applied Behavior Analysis (JABA)* website (1968-2004). The keywords for the search were “recruitment” and “attendance.”

Selection criteria. The articles found via the above-mentioned method were manually screened based on the following inclusion criteria: (a) the goal of the study was to investigate what variable would affect individuals’ attendance at community-based intervention programs; (b) the percentage or the number of attendees was measured and compared across conditions; (c) the study was a true experiment consisting of behavior analytic variables and procedures such as antecedent control, even though the authors did not necessarily state this explicitly in the article; and (d) the programs to which the authors attempted to recruit individuals were prevention programs, rather than treatment programs.

Screening process. Table 1 presents the number of articles selected and excluded in each screening step. In Step 1, a total of 427 articles were identified after the initial online search. In Step 2, 387 of the 427 articles were excluded because Criteria (a) and/or (b) were not met. In Step 3, an additional 21 articles were excluded because they either used

TABLE 1. THE SCREENING PROCESS FOR SELECTING REVIEWED ARTICLES AND THE NUMBER OF EXCLUDED AND SELECTED ARTICLES IN EACH STEP. THE LITERATURE SEARCH WAS INITIALLY CONDUCTED USING ONLINE DATABASES, PUBMED, PSYCARICLES, AND PSYCINFO, AND THE WEBSITE FOR THE JOURNAL OF APPLIED BEHAVIOR ANALYSIS (JABA).

Screening	Criteria	Excluded		Selected			
		Total	PubMed	PsycArticles	PsycInfo	JABA	Total
Step 1	Keywords “recruitment” & “attendance”		82	291	53	1	427
Step 2	Recruit individuals to intervention programs	387	23	7	9	1	40
Step 3	Experimental study	21	10	2	6	1	19
Step 4	Prevention programs	4	7	1	6	1	15

subject variables such as sociodemographic characteristics as predictors (16 articles), were review articles (3 articles), or did not have control conditions (2 articles). Therefore, those articles did not meet Criterion (c). Finally, in Step 4, 4 articles were excluded because the studies recruited people to treatment programs, rather than prevention programs, thus failing to meet Criterion (d). As a result, 15 articles remained for the review.

Selected Articles

The selected recruitment studies are alphabetically listed in Table 2. The first, second, and third columns of the table specify the author(s), the purpose of the program, and target individuals of the studies, respectively.

Independent Variables of the Selected Studies

The selected articles were divided into the following four groups according to their independent variables: 1) contingencies between the target behavior and its consequence were specified or not specified in the invitation; 2) the values of consequences mentioned in the invitation were altered; 3) response efforts stated in the invitation were manipulated; and 4) others. These groups were named Groups 1-4, respectively

RESULTS AND DISCUSSION

Types of Prevention Programs

Of all the 15 recruitment studies selected, 13 (87%) were conducted for health-related programs: 8 prevention/screening programs for chronic diseases, mainly cancer; 2 education programs to reduce alcohol abuse and risky sexual behavior; 2 teaching programs for health professionals; and 1 nutritious meal program for the elderly. The remaining 2 (13%) were conducted for parent education programs.

Independent Variables

Table 3 shows the results of the categorization into Groups 1 through 4. When a study had more than one independent variable or more than one component in an intervention condition, the study was categorized in two or more groups. For example, Bunck and Iwata (1978) compared the presence or absence of incentive menu and three different modes of communication. As a result, the study was put into Groups 1 and 4.

Group 1: Contingencies Specified

The five studies in this group assessed the effect of the invitation clearly stating what would be provided to the individuals when they attend the programs.

Natural contingencies. The natural consequences of attending these prevention programs are that the participants will obtain useful information and ultimately, help

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TABLE 2. THE AUTHORS, PURPOSES OF THE PROGRAMS, AND TARGET INDIVIDUALS OF REVIEWED RECRUITMENT STUDIES.

Authors (Year)	Program	Target Individuals
Bunck & Iwata (1978)	Nutritious meal program	202 senior citizen households
Cabana et al. (2004)	Asthma teaching program	299 pediatric primary care providers
Clover et al. (1992)	Mammographic screening	175 women aged 49-69
Clover et al. (1996)	Mammographic screening	2,359 women aged 40-69
Connors & Gabel (1983)	Rural parent group	263 families in a rural area
Greenberg et al. (1998)	HIV infection prevention	444 high-risk women
Gries et al. (1995)	Alcohol abuse education	1,433 undergraduates
Hurley et al. (1994)	Mammographic screening	2,225 women aged 50-69
Yaomans-Kinney et al. (1998)	Breast cancer prevention	175 at-risk women
Lindholt et al. (1998)	Screening for aortic aneurysm	4,404 men aged 65-73
Lord et al. (2003)	Mammography technique teaching	Physicians, nurses, technicians
Schofield et al. (1994)	Mammographic screening	618 women in communities
Turnbull & Irwig (1992)	Mammographic screening	Residents of 157 streets
Wardle et al. (2003)	Colorectal cancer screening	2,966 adults aged 55-64
Watterson (2001)	Parent education program	Parents of 320 students

prevent the future occurrence of the problem in question. Gries, Black, and Coster, (1995) included such statements of natural contingencies in the invitation to alcohol abuse education programs to university students. The students residing in the control hall ($N = 706$) received pastel-colored flyers, table tents, and table notices with a picture of a game board and text "It's fun, it's educational, it's alcohol jeopardy." The students residing in the treatment hall ($N = 727$) received neon-colored flyers, table tents, and table notices with text such as "Learn the facts," and "Learn to help a friend if they ever

TABLE 3. THE TYPES OF ANTECEDENT CONTROL PROCEDURES THAT THE SELECTED RECRUITING STUDIES USED. THE AUTHORS AND PROCEDURES USED IN THE STUDIES ARE SPECIFIED IN THE SECOND AND THIRD COLUMNS.

Types of Antecedent Control	Authors (Year)	Procedures
Group 1: Contingencies specified	Gries et al. (1995)	Natural consequence and rewards
	Bunck & Iwata (1978)	Rewards specified
	Lord et al. (2003)	Rewards specified
	Greenberg et al. (1998)	Rewards specified
	Watterson (2001)	Rewards specified
Group 2: Values of consequence	Connors & Gabel (1983)	More info about consequence
	Wardle et al. (2003)	More info about consequence
	Turnbull & Irwig (1992)	More info about consequence
	Yaomans-Kinney et al. (1998)	Invitation from professional
	Clover et al. (1996)	Invitation from professional
	Clover et al. (1992)	Invitation from professional
	Cabana et al. (2004)	Invitation from professional
Group 3: Reduced response efforts	Watterson (2001)	Program co-led by peers
	Hurley et al. (1994)	Appointment time specified
	Watterson (2001)	Transportation and on-site childcare
Group 4: Others	Lord et al. (2003)	On-site demonstration
	Bunck & Iwata (1978)	Mode of communication
	Schofield et al. (1994)	Mode of communication
	Hurley et al. (1994)	Mode of communication
	Clover et al. (1996)	Mode of communication
	Hurley et al. (1994)	Repeated invitations
	Lindholt et al. (1998)	Repeated invitations

develop an alcohol and drug problem.” In addition, the materials for the treatment hall explicitly mentioned program incentives including certificates for local restaurants, CDs, and sporting event tickets. More treatment students (17) attended the program than control students (0), and the difference was statistically significant (adjusted attendance rates were 2.75% for treatment hall and 0% for control hall, $Z = 4.53$, $p < .01$). The

treatment and control conditions in the study differed in terms of the color of the materials, the statements about what information the participants will learn, and about what tangible rewards the participants will receive. Unfortunately, the researchers did not conduct any component analyses. Based on the results of the remaining studies in Group 1, however, it is likely that the statement about the tangible rewards had the greatest impact on the results.

Rewards stated in the invitation. Bunck and Iwata (1978) recruited more individuals by specifying the presentation of rewards. They used a 58-item incentive menu that included movies, trips, house plants, lottery tickets, and services such as housecleaning and car washing, which would be presented contingent on the individuals' participation in a nutritious meal program. The menu was sent by mail to 202 senior citizen households along with the invitation to the program. This incentive-menu condition was compared with the effect of several modes of communication (newspaper and radio announcements, home visits, and phone calls; details are described in Group 4 below). Bunck and Iwata divided the households into three groups: 69 households for Group I, 63 for Group II, and 70 for Group III. The above-mentioned conditions were presented successively in a multiple-baseline design across Groups I—III. The incentive menu was more effective in recruiting new participants (five, three, and seven new participants in Groups I, II, and III, respectively) than newspaper announcement, radio announcements, and phone calls. However, home visits resulted in similar numbers of participants (six and two new participants in Groups I and II, respectively) as incentive menus.

Lord et al. (2003) used a similar method to recruit physicians, nurses, and mammography technicians to breast cancer research program. The researchers compared a demonstration-plus-lunch condition and several modes of communication (postcards, mailed questionnaires, phone calls, and solicitation at a local medical meeting; details are described in Group 4 below). In the demonstration-plus-lunch condition, the recruiters made an appointment with the target individuals for research participation by phone and informed them that the participants would receive an on-site demonstration of a clinical breast examination technique and a free lunch. While this method resulted in recruiting 224 health professionals, the other four strategies did not yield any participants. The authors did not specify the number of professionals initially approached or report any statistical analyses. The most effective component of the procedure may have been the statement about the on-site demonstration in the invitation, which probably reduced response effort for participation (details are described in Group 3 below), rather than the offer of a free lunch.

Greenberg, Lifshay, Van Devanter, Gonzales, and Celentano (1998) designed a HIV preventive program consisting of multiple sessions and invited 444 high-risk women (i.e., women who had had a sexually transmitted disease in the past year, injected drugs, traded sex for money). These women were first recruited from community sources, clinics, and drug programs. The recruiters informed the women that they would receive a cash incentive of \$10-20 for some of the sessions as a consequence of attendance. The study used a within-subjects group design. The average attendance rate for the 6 sessions in the incentive condition was 83%, while the attendance rate for the 12 sessions in the no-

incentive condition was 8%. The study did not report the results of statistical analyses. Since the recruiters informed the women about the presence or absence of monetary incentives before each condition began, the attendance was presumably evoked by the information, rather than shaped by the contingency. The study, however, included two possible confounding variables. First, the 6 paid sessions were offered first and then the 12 unpaid sessions followed. Further, the former focused mainly on skill building and goal setting, while the latter consisted of fun activities, open microphone sessions, guest speakers and video presentation. Hence, one cannot unambiguously conclude that the information about the incentives caused the change in attendance.

Watterson (2001) invited low-income, high-risk parents of 320 students to a multiple-session parent education program. The recruiter informed the the parents in an intervention condition that participants would receive gift certificates for local stores and restaurants. The invitation delivered to the parents in the control condition did not mention the presentation of the reward. Chi-square tests showed that significantly more parents in the intervention condition attended at least one session. Thus the statement about the reward brought more parents to the program.

The above studies demonstrate that recruitment is more successful when the invitation clearly states the target behavior and its consequence. In these studies, the target individuals had not participated in the programs that they were invited to. Thus, the individuals had not yet experienced the contingencies between the target behavior and its consequence. Therefore, their participation in the program is likely to be rule-governed behavior controlled by the contingencies specified in the invitation, rather than contingency-shaped behavior. In each of these studies, however, the consequence stated in the invitation included the presentation of tangible rewards such as gift certificates and monetary incentive. Thus, the success in the above studies may be attributed to the fact that the consequence of attendance would be the presentation of rewards, rather than the fact that the consequence was clearly written in the invitation.

When a recruiter attempts to increase the number of participants by clarifying the consequence of the target behavior, s/he needs to be certain that the consequence specified in the rule (i.e., invitation) actually function as a reinforcer for the potential participants. Naturally-occurring consequences for these prevention programs may not necessarily function as reinforcers (e.g., obtaining knowledge about alcoholism) or sometimes may function as aversive consequences (e.g., the fear of a diagnosis of cancer). Therefore, it may be more effective if the rule describe several choices of tangible rewards or generalized reinforcers such as gift certificates and money.

Group 2: The Value of Consequences Altered

More information about the program. All invitations to prevention programs may describe their primary purposes, such as screening for cancer. The recruiters of the following studies attempted to manipulate the value of the consequences of participation by providing the individuals with more information about the programs. Two of the three

studies described below succeeded in recruiting significantly more individuals using such procedures.

Connors and Gabel (1983) recruited parents of 263 families in four counties in a rural area to parent groups. A flier announcing the program was sent to all parents via their children in school. When paraprofessionals used personal and phone contacts to explain the group goals and other information about the programs (e.g., the groups would deal with issues including how to motivate children and would discuss how to use behavioral techniques), 34% of the 172 families participated. On the other hand, none of the 91 families who did not receive any contacts from paraprofessionals participated ($t_{(215)} = 4.28, p < .001$).

Wardle et al. (2003) also offered more information to the target individuals by distributing psychoeducational booklets. They invited 2,966 men and women to colorectal cancer screening programs. The adults in the control group ($N = 1,513$) received a usual screening invitation, whereas the adults in the intervention group ($N = 1,453$) received a mailed psychoeducational booklet 2–3 weeks before they received the usual screening invitation. The psychoeducational booklet took the form of simple questions and answers about screening, presented in cartoon strips. The booklet described the positive aspects of screening such as the benefit of early detection, and was intended to reduce its negative images such as the procedure being embarrassing and painful. The intervention group had a higher attendance rate (53.5%) than the control group (49.9%), and the difference was statistically significant ($\chi^2_{(1)} = 10.5, p < .05$). The procedures indicate that the researchers attempted to recruit more individuals by establishing the effect of reinforcing consequence, and abolishing the effect of punishing consequence (Laraway et al., 2003).

Turnbull and Irwig (1992) also recruited women to mammographic screenings by providing them with more information. The researchers left 3,984 leaflets about the screening service in the mailboxes on 79 intervention streets. They then compared the attendance of the women from the intervention streets and the women who lived on 78 control streets where no leaflets were dropped. Turnbull and Irwig did not find the difference between the attendance in the leaflet and no-leaflet conditions: 75 vs. 27 attendees before the intervention; 47 vs. 33 attendees after, (RR = 1.15, 95% CI 0.61 to 2.19). Their failure to recruit women to the program may be attributed to the contents of the leaflet, which unfortunately were not described in the article.

Invitations and recommendations from professionals. Four studies manipulated the characteristics of recruiting agents. Specifically, invitations through letters, phone calls, and in person were provided by professionals in the relevant area (e.g., general practitioners) to some of the target individuals. When professionals invited the individuals, studies were more successful in recruiting. Such outcomes were derived presumably because that the consequence of the behavior (e.g., the information provided during and after the participation in the programs) was considered more credible, important, and less uncertain. Therefore, these studies were included in this group,

Yaomans-Kinney, Richards, Vernon, and Vogel (1998) reported that more women participated in a breast cancer prevention trial when their primary care physicians advised

them to participate. The target individuals were 175 high-risk women who have discussed the possibility of enrolling in the trial with their physicians. The physicians advised them to enroll, advised them not to enroll, or left the decision up to them. Approximately half of the target individuals (89 women) enrolled in the trial. However, women who were advised to enroll were 13 times more likely to participate than were women who were advised not to enroll ($p < .01$), and were 5.8 times more likely to participate than were women whose physicians left the decision up to the patients (a result of statistical analysis not provided).

Clover, Redman, Forbes, Sanson-Fisher, and Callaghan (1996) found that invitations from professionals led to more attendance than a large-scale community intervention on women's attendance at mammographic screenings. Pairs of matched towns were randomly assigned to the two conditions: physician-recommendation intervention and community-participation intervention. The physician-recommendation intervention involved recommendations from family practitioners, waiting room displays, and practitioners' talks at the local hospital. The towns in the community-participation condition had a committee of 7-10 community representatives who were in official positions within various groups, including church groups, hospital auxiliary, and Country Women's Association. The representatives promoted the program by often speaking to friends, relatives, and colleagues, giving out posters and pamphlets, and personally distributing appointments. There were a total of 489 target women in the physician-recommendation condition and 524 women in the community-participation condition. Significantly more women attended in the physician-recommendation condition than in the community-participation condition in the pair of larger towns (65% and 47%, respectively, $Z = 4.935$, $p < .001$). However, there was no significant difference in the pair of smaller towns (66% and 55%, respectively, $Z = -0.82$, $p = .41$). The authors speculated that the result for the smaller town may have been due to a higher proportion of ineligible women (i.e., women with previously diagnosed breast cancer, women who had undergone a mammogram in the previous 12 month, and women known to have died or moved from the address on the electoral register).

Clover and colleagues (1992) conducted another study to compare the attendance at mammographic screenings. In one condition, 92 women received simple recommendation from their general practitioners. Specifically, general practitioners told their patients that it is important that the patients take mammography screening and gave them the information about a hospital offering free screenings. In the other condition, 83 women received an intensive education including the additional benefits of mammography and detailed description of the procedure, which was provided by their general practitioners using flip charts. The attendance rates for both conditions were high: 82% and 91%, respectively. No significant difference was found ($p = .13$). Thus, a simple recommendation from the practitioners was as effective as an extended description of screening by the practitioners.

Finally Cabana et al. (2004) invited 299 local pediatric care providers to an asthma educational program. When the medical director of the organization providing the program gave phone calls to the care providers, 27% of the 94 providers participated.

When the medical director did not participate in the recruitment, 13% of the 215 providers agreed. The difference in the two conditions was statistically significant ($p < .01$, chi square).

These studies demonstrated that the invitation from professionals is a highly effective method for recruiting individuals to health-related prevention programs. As noted earlier, it may be that the invitations from professionals increased the value of consequences of target responses; hence, these procedures may exemplify establishing operations. A number of social psychology studies have also found that certain characteristics of individuals, such as being a professional in a relevant area, are more effective as antecedent stimuli than others (DeBono & Klein, 1993; Krackow & Blass, 1995). This antecedent control technique has also been used in the area of marketing and advertisements, such as a toothpaste commercial featuring an actor in a lab coat and the “surgeon general warning” on a package of cigarettes. It is not clear, however, whether the variable in question is simply categorical (i.e., professionals vs. lay people) or whether manipulations on several dimensions, such as the recruiters’ age, years of experience, and amount of knowledge in the area, will have differential effects on participation. Further, especially in the case of Yaomans-Kinney et al. (1998) and Clover et al. (1992), it is not certain whether recommendations or intensive education provided by anyone other than the practitioners would have had the same effect.

Additionally, one might argue that the individuals’ participation increased because of their learning histories with those particular professionals in the study (most of them were family practitioners), other professionals, or other authority figures such as parents, teachers, and bosses. If that is the case, the professionals may have been generalized discriminative stimuli that were associated with those reinforcers, rather than antecedent stimuli that changed the values of the consequences.

Program co-led by peers. One of the Watterson’s (2001) intervention conditions, described earlier in Group 1, was somewhat similar to the above four, but she manipulated the type of a person leading the program, rather than recruiting agents. Parents in the intervention condition were told that the sessions would be co-led by another parent. Compared to the control condition, more parents attended at least one session of the program in the intervention condition. No specific quantitative data for each condition or the results of statistical analyses were described in the study. Such favorable results were obtained in the intervention condition presumably because the parents perceived that the information provided by the co-leader, another parent, would be more credible and useful.

Different individuals could have different effects as discriminative stimuli for the same response, even when those individuals deliver the same consequence (Ringdahl & Sellers, 2000). Watterson (2001) demonstrated that the target individuals may or may not participate in the program, depending on who they are informed will conduct the program and will deliver the training and information as a consequence.

Group 3: Reduced Response Effort

The invitation used in the following studies consisted of a statement describing reductions in response effort required for participation.

Appointment time stated in the invitation. Hurley, Hugging, Jolley, and Reading (1994) compared the effects of invitation letters with and without an appointment time. Of the 424 women who received the letters with appointment time, 40.1% attended the mammography program. The attendance rate for the 1,010 women who received the letters with no appointment time was 29.5%. Although the attendance rate was higher for the condition with appointment time, no statistical analysis was provided to compare these two conditions. The researchers did not offer any interpretation for the results. However, a plausible explanation may be that response effort was lower for the women in the condition with the invitation with appointment time because the women were not required to contact a clinic to make an appointment.

Providing transportation and childcare. Watterson's (2001) study, described earlier in Groups 1 and 2, had another intervention condition. To recruit more low-income, high-risk parents to a parent education program, the researcher told the parent in the treatment condition that the parents would be provided with transportation and on-site childcare. The number of parents who participated in more than one session was greater in this condition than in the control condition. The author did not report specific quantitative data for each condition or the results of statistical analyses.

On-site demonstration. The invitation used in the Lord et al.'s (2003) study, also described in Group 1 earlier, stated reduced response effort for participation. The recruiters made an appointment with the target physicians, nurses, and mammography technicians by phone and informed them that an on-site demonstration of a clinical breast examination technique would be provided. That is, all the invitees had to do was to wait for the demonstrator to come to their hospitals/clinics and observe. Only this method resulted in recruiting target individuals, who were 224 health professionals. The authors did not report the number of professionals initially approached or the results of statistical analyses.

When the target behavior is to participate in the program, a task analysis may divide the behavior into several components. For example, Watterson (2001) implied that the target parents in the control condition may have had to (1) hire a babysitter, (2) drive or use public transportation to go to the program site on the day of appointment, and (3) join the session. However, the parents in the intervention condition, who were provided with transportation and on-site childcare, did not have to experience (1) and (2). In Hurley et al. (1994) and Lord et al. (2003), the individuals in the control condition had to (1) make an appointment, (2) drive or use public transportation to go to the program site on the day of appointment, and (3) join the session. Hurley et al. omitted (1) in the intervention condition and Lord et al. omitted (1) and (2). Thus, recruiters can reduce response effort by eliminating one or more component responses in a behavioral chain related to participation.

Group 4: Others

The procedures of the following six studies were not readily categorized in the above three groups. These studies examined either of two variables: the mode of communication or the number of invitations.

Mode of communication. The following studies compared the effects of different modes of communication, such as public announcements and direct contact with target individuals.

Bunck and Iwata (1978) recruited senior citizens in a certain community to a nutritious meal program (described in Group 1). Four different means of communication, newspaper announcement, radio announcement, home visit, and phone calls were compared with regard to the number of new participants in the program. Significantly more new participants attended the program when recruiters visited their houses to invite them to the program (six and two new participants in Groups I and II, respectively) than when the invitation was through newspaper announcement (zero for all groups), radio announcements (zero, one, zero participants in Groups I, II, and III), or phone calls (one and zero in Groups I and II). That is, the most personal procedure, which was called “intensified prompting” by the authors, was most effective. The other three less personal procedures were equally ineffective.

While Bunck and Iwata (1978) compared several types of communication tools, each of the following three studies compared public and personal recruiting procedures. Schofield, Cockburn, Hill, and Reading (1994) conducted a recruitment study for a mammography screening program. There were 39,963 women aged 50-69 years residing in the target community when the research began and the attendance status for 639 randomly sampled women was recorded. First, the researchers conducted a community health promotion campaign including articles in local newspapers, promotional material in shops, display of the program’s banner in shopping centers, personal contact by the education officer with health-related organizations and workers, stalls at shopping centers and local fetes at which appointments could be made, and letters and talks to clubs, community, and workplace groups. After the second campaign was implemented 12 months subsequent to the initial campaign, personal invitations were sent to non-attendees by mail. The attendance rate considerably increased after the personal invitations: from 35% to 58% for the women living within a radius of about 2 km from the program site; and from 17% to 44% for the women residing in an area between 10 and 20 km from the site. The authors did not report the results of statistical analyses.

Hurley et al. (1994) first implemented public recruitment strategies. The strategies included articles in local newspapers delivered free to each home, information displays, establishment of appointment stalls in public places, and contact with community, workplace, and health information organizations by an education officer. A total of 2,225 women aged 50-69 years living in a community were targeted. Personal invitation letters for mammographic screening campaign with and without appointment times, then, were mailed to non-attendees as a personal recruitment strategy. While 16.6% of women participated in the program during the public campaign, the attendance rate increased to

33.4% after the personal letters were sent out. There was no statistical difference between the public and personal strategies, however.

Clover et al. (1996) also targeted 2,359 women in communities for mammographic screening program by using mass-media promotion (newspaper and radio coverage) and community-participation intervention (described in Group 2). Pairs of matched towns were randomly assigned to the two conditions. There was significantly higher attendance in the community-participation condition than in the mass-media condition (62% vs. 31% for the pair of smaller towns, and 47% vs. 32% for the pair of larger towns). Statistical tests demonstrated that these differences were significant for both smaller towns and larger towns (smaller towns $Z = -5.95, p < .001$; larger towns $Z = -4.59, p < .001$).

In Schofield et al. (1994) and Hurley et al. (1994), the sequential effect may have served as a confounding variable. However, the authors' conclusions about the effectiveness of direct recruitment in the above four studies are consistent with the conclusions of Denhaerynck et al.'s (2003) meta-analysis. Denhaerynck et al. found that direct-contact or personal invitations for mammography screening can increase attendance rates. In Bunck and Iwata (1978), however, phone calls, which are generally considered as a more direct method than letters, did not show any effects.

This noticeable effectiveness of the direct recruiting method may be attributed to at least two behavior-change mechanisms. First, when the recruiter directly contacts a target individual either by phone or in person, the communication becomes mutual and the both parties are allowed to interact with each other. In such an interaction, the individual may ask questions and make comments about possible reinforcers and punishers for participating in the program. That is, the recruiter in turn can provide the individual with specific information that alter the values of the consequences mentioned, thus the procedure may be considered as an establishing operation. Second, when the target individual was directly approached, the response effort of refusing the invitation may be greater. Therefore, direct contact may be successful in recruiting more individuals because the procedure increases the effort for competing behavior; i.e., saying, "No."

Repeated invitations. Hurley et al. (1994) mailed invitations to 1,434 women aged 50-69 years in a community to a mammographic screening program. After the follow-up letters were sent to non-attendees 4 weeks after they received the first invitation, the attendance rate increased from the initial rate of 33.4% to 36.1%. The results of statistical analyses were not provided.

Similarly, Lindholt, Juul, Henneberg, and Fasting (1998) invited 4,404 men aged 65-73 years to mass screenings for abdominal aortic aneurysms by mail. The initial attendance rate was 70%. After the second letter was mailed to non-attendees, the attendance rate increased to 76%. This study did not provide the results of statistical analyses, either.

The results of the above studies indicate that the second invitation was effective in recruiting more individuals. The outcome may also be explained by two behavioral principles. First, the repeated provision of information made the consequence appear more important (i.e., an establishing operation). Second, more individuals participated in the program to avoid further contact by the recruiters (i.e., negative reinforcement for

attending). The above two studies, however, observed slight increments after the second invitation and did not provide any statistical data. Therefore, it is uncertain that the effect of the intervention procedure was truly significant. Also, the studies did not have control groups that did not receive the second invitation. Therefore, one may argue that the attendance rates would have increased anyway regardless of the second letter. Further, in neither of the two studies, the contents of the second invitation letter were described. If the first and second invitations had contained different information, it may have served as a confounding variable.

GENERAL DISCUSSION

Recruitment Studies Explained with Behavioral Principles

This paper reviewed studies in which researchers attempted to recruit individuals to community-based prevention programs. Many of those researchers and recruiters were probably not behavior analysts; indeed, in any of the studies reviewed except Bunck and Iwata (1978), authors did not use behavior analytic terms to describe intervention procedures. However, it was found that the recruiting methods implemented in most of the studies could readily be described and explained with behavior analytic principles. The researchers manipulated some dimensions of antecedents (e.g., the type of recruiting agents, the number of invitations, the mode of communication), target behavior (the number of responses within a response chain), and consequences (specified or not specified, the amount of information about the consequence) of participation within the invitation. Specifically, the reviewed studies used the following procedures.

In the five studies in the first group, the contingencies between the target behavior (participation in the program) and the consequences (tangible rewards) were clearly specified in the invitation for the intervention conditions. The target individuals who were invited to the program had not participated in the program prior to the invitation. Therefore, their participation may be considered rule-governed behavior controlled by the invitation stating the contingencies.

In the second group, the values of the consequences described in the rule were manipulated. Three studies provided the target individuals with more information about the consequences (e.g., information about breast cancer), which may have increased reinforcing effects and decreased punishing effects of the consequences. In five other studies in the same group, recruiting agents and leaders of the program differed across conditions. The researchers recruited more individuals when professionals invited the individuals to the program or the program was co-led by peers. Such results may be examples of establishing operations, in which the effectiveness of the consequences altered.

In the third group, the researchers omitted one or more component responses in the target behavioral chain (i.e., participating in the program) in the intervention conditions. Specifically, the invitations stated that the program would not require the invitees to hire a babysitter, make an appointment, or go to the program site. Therefore, the invitation

stated reduced response effort for participation, which was responsible for successful recruitment.

The six studies in the last group, which manipulated either the mode of communication or the number of invitations, were not included in the first three groups. However, the procedures and outcomes of these studies can also be explained by some of the behavioral principles such as establishing operations and negative reinforcement. For example, when studies compared different modes of communication, direct invitations (e.g., phone calls, home visits) were more effective than indirect invitations (e.g., newspaper, radio, television) in recruiting individuals. This may be due to an establishing operation that occurred through interactive communications between the recruiter and target individual. It is also possible that direct contact increased response effort of the individual for declining the invitation. When studies manipulated the number of invitations, the effects of repeated invitation may also be attributed to an establishing operation derived from accumulated information about the program. Otherwise, the individuals may have participated in the program to avoid further invitations, which suggests that negative reinforcement may have taken place.

Behavior Analytic Methodologies for Recruitment

While the behavior change that occurred in the reviewed studies can be explained with behavior analytic terms, the studies did not necessarily use behavior analytic methodologies, which are characterized by unambiguous demonstrations of the environmental events responsible for the change in the target behavior (Baer, Wolf, & Risley, 1968). The intervention groups in some of the reviewed studies included several components (e.g., Gries et al., 1995; Lord et al., 2003). In addition, there were studies in which the intervention and control groups differed in more than one variable (e.g., Bunck & Iwata, 1978; Clover et al., 1996), which resulted in possible confounds.

The primary reason for such imperfect designs may be that the purpose of the studies was to recruit more individuals so that the subsequent program would be successful, rather than to determine functional relationships between independent and dependent variables. In fact, many of the researchers noted that combining several antecedent control techniques is the most effective recruiting method. For example, Hobbs (1986) suggested that the optimal invitation strategy for a mammography program consists of multiple components including a recommendation by the target individual's own doctor (possibly an establishing operation) accompanied with specific health education messages (specified natural consequences and an establishing operation), an appointment date and time (reduced response effort), and a reply paid card (reduced response effort). Additionally, cost considerations may have limited interest in determining such functional relations. It is possible that the researchers could not afford several different conditions or component analyses, since recruitment studies with group designs are typically conducted on a much larger scale than those with single-subject designs.

Other General Issues in Recruitment Studies

As described above, 6 of the 15 reviewed studies did not report the results of statistical analyses to compare the variables introduced above. The rationale for not doing so may vary among the studies. For example, Bunck and Iwata (1978) utilized a multiple-baseline design, in which researchers typically analyze data with visual inspection. The study by Watterson (2001) was published in a journal containing only abstracts of studies. Further, in Schofield et al. (1994) and Lindholt et al. (1998), investigating the effect of different recruitment methods did not appear to be the primary purpose of the studies. Nevertheless, it is recommended in the future that the researchers of recruitment studies conduct statistical analyses and report the results.

Additionally, none of the reviewed studies included the information concerning obtaining informed consent from research participants. The researchers may have considered that the participants would be exposed to no or minimum risk, for which informed consent might be dispensed with (American Psychological Association, 2002). However, the amount of information that research participants received may have a considerable effect on the outcome of recruitment studies. Therefore, it is important for the authors to report how they designed the study from an ethical standpoint, whether the participants had any knowledge about the research, and what information was given to the participants.

Avoiding No-Shows

Kanzler, Zeidenberg, and Jaffe (1976) and Ferrari, Barone, Jason, and Rose (1985) reported that if the individuals showed interest in participating in a program or even said they would participate, they may not necessarily do so. This problem has been observed in prevention programs. For example, of 70 pediatric care providers who agreed to attend the two-seminar program in Cabana et al. (2004), 16% attended only one seminar and 9% attended neither. Likewise in Clover et al. (1992), 4.5% of the 154 women who made an appointment for mammography screening did not keep the appointment. These outcomes were not described in detail in the Results section of the present paper, since the purpose of the paper was to investigate what variables improved the number of individuals who actually participated in the programs. However, reduction in absenteeism is a crucial issue for any intervention programs.

Such discrepancy between “saying” and “doing” have been much studied within the context of patient compliance with treatment programs. Greenspoon (1997) suggested a patient is more likely to keep an appointment when s/he is seen immediately. Festinger, Lamb, Kirby, and Marlowe (1996) confirmed this when they reported that when callers were allowed to come to the clinic on the same day they called, more appointments were kept than when callers had to wait for 1–7 days. Greenspoon also reviewed some studies in which telephone and mailed reminders were effectively used to increase compliance. For example, Turner and Vernon (1976) reduced the number of no-shows by providing applicants at a mental-health center with phone reminders 1–3 days prior to their appointments. These techniques may also be useful in prevention studies.

Some Suggestions for Future Research

Systematic manipulations of variables, such as the ones in Festinger et al. (1996) and Turner and Vernon (1976), may be used for recruitment. As noted earlier, few of the studies reviewed above conducted such manipulations. For example, the studies categorized in Group 2, which altered the values of consequences, did not systematically change the recruiting procedures in intervention and control conditions by manipulating the variable on one dimension. However, a number of applied studies have demonstrated that an establishing operation can be implemented by manipulating a certain stimulus dimension such as the availability of the consequence (Carr, Bailey, Ecott, Lucker, & Weil, 1998). Therefore, it is highly possible to conduct a recruitment study consisting of the invitations in which the statement about the availability of the consequence is systematically changed.

In such attempts, it is expected that a researcher will observe interaction effects between the stimulus dimension selected for manipulations and other variables. The variables may include the type of consequences (e.g., natural consequence vs. tangible incentive), recruiting agents (professional vs. lay person), and the mode of communication (direct vs. indirect). Considering there is little behavior analytic research for recruitment, procedural possibilities for future studies appear to be substantial.

CONCLUSION

The selected recruitment studies for prevention programs were divided into groups according to different antecedent control techniques used in their recruiting procedures. These procedures included altering the values of consequences and reducing response efforts for the target behavior. Many of the studies, however, consisted of compound and confounding variables. Having not clearly demonstrated the effects of the variables responsible for the individuals' participation in the programs, these studies can hardly be considered behavior analytic.

Suggestions for future research for recruitment studies include the manipulations of certain stimulus dimensions as independent variables, such as the magnitude and availability of consequences. The outcomes of the reviewed studies indicate that no matter which stimulus dimension is manipulated in a future study, there may be interaction effects between the variable and other variables such as the type of consequence and recruiting agents. Since there are few recruiting studies conducted by behavior analysts, such studies are expected to become valuable additions to behavior analytic research in the community.

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